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Siboga-Expeditie

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AAN BOORD **H. M. SIBOGA** ONDER COMMANDO VAN

Luitenant ter zee 1e kl. G. F. TYDEMAN

UITGEGEVEN DOOR

Dr. MAX WEBER
Prof. in Amsterdam, Leider der Expeditie

(met medewerking van de Maatschappij ter bevordering van het Natuurkundig Onderzoek der Nederlandsche Koloniën)

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THE

GORGONACEA OF THE SIBOGA EXPEDITION

VII. THE GORGONIDÆ

BY

C. C. NUTTING
Professor of Zoology, State University of Iowa

With 3 plates

(Aided by a grant from the ELIZABETH THOMPSON SCIENCE FUND)

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Family GORGONIDÆ Verrill.

Gorgonacées (in part) Milne Edwards et Haime. Histoire naturelle des Coralliaires, I, 1857, p. 144.
Gorgonia Kölliker. Icones Histiologicæ, II, 1865, p. 135.
Gorgonidæ Verrill. Transactions Connecticut Academy of Arts and Sciences, I, 2, 1867—71, p. 384.
Gorgonaceæ (in part) Duchassaing de Fontbressin. Revue des Zoophytes et des Spongiaires des Antilles, 1870.
Gorgonidæ Studer. Versuch eines Systemes der Alcyonaria, 1887, p. 61.
Gorgonidæ (in part) Ridley. Alcyonaria of the Mergui Archipelago, 1888, p. 233,
Gorgonidæ Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 146.
Gorgoninæ Delage et Hérouard. Traité de Zoologie Concrète, II, 2, 1901, p. 420.
Gorgonidæ Hickson. Alcyonaria of the Cape of Good Hope, II, 1904, p. 227.
Gorgonidæ Nutting. Alcyonaria of the Californian Coast, 1909, p. 722.

Although VERRILL (1867—71) appears to have been the first one to use the name Gorgonidæ in its restricted sense as a family designation, he does not appear to have defined it, although he discusses several of its genera at considerable length.

KÖLLIKER (1865) uses the word Gorgonidæ as a family designation, but as thus used it embraced the whole of what is now known as the Gorgonacea. This writer employs the name "Gorgonacea" for a section of his subfamily "Gorgoninæ", thus practically reversing the relative rank of the names as we now know them. In his genus "Gorgonia" he includes practically all of the species then known that would now go into the family Gorgonidæ. The first formal and adequate definition of the family was given by STUDER in 1887 in his classic work "Versuch eines Systemes der Alcyonaria" which is probably the most helpful single contribution to our knowledge of the general systematic treatment of the Alcyonaria. His definition will be adopted for our present purpose, and may be translated as follows:

"Colony upright, branched, usually flabellate, with horny (rarely calcareous) axis. Polyps bilaterally or biradially placed on stem and branches, corresponding to a biradiate arrangement of the canal system. The upper part of the polyp is retractile either into an exserted calyx or within the cœnenchyma which presents a smooth surface. The spicules are small, preponderatingly spindles which are not arranged in two layers".

The region explored by the Siboga Expedition is one in which the family Gorgonidæ is very poorly represented, and the collection contains so few species (five in all) that it does not offer a basis for a systematic discussion. The writer will therefore content himself with adopting, in the main, the excellent generic definitions of STUDER, and will discuss only the four genera represented in the collection.

The paucity of representation of this family in this and other extensive collections in the East Indies is remarkable when contrasted with the great number of Gorgonidæ in the West Indies and on the Pacific Coast of tropical America, and indicates very plainly that the centre of distribution of the Gorgonidæ is in the warmer waters of the Western Hemisphere.

Synoptic view of the genera and species of GORGONIDÆ collected by the Siboga Expedition.

New species are indicated by an asterisk (*).

Lophogorgia.

*Lophogorgia *pinnata.*

Leptogorgia.

*Leptogorgia *formosa.*

Stenogorgia.

*Stenogorgia miniata, S. *studeri.*

Platycaulus.

*Platycaulus *sibogæ.*

The only previously known species in this list, *Stenogorgia miniata* (Valenciennes) has hitherto been known only from the Atlantic Ocean, where it has been taken in the West Indies and Azores.

Systematic description of genera and species.

Genus **Lophogorgia** Milne Edwards et Haime.

Lophogorgia Milne Edwards and Haime. Histoire naturelle des Coralliaires, I, 1857, p. 167.
Gorgonia (in part) Kölliker. Icones Histiologicæ, II, 2, 1865, p. 139.
Leptogorgia (in part) Verrill. Transactions Connecticut Academy of Arts and Sciences, I, 2, 1867—71, p. 387.
Leptogorgia Duchassaing de Fontbressin. Revue des Zoophytes et des Spongiaires des Antilles, 1870, p. 17.
Lophogorgia Studer. Versuch eines Systemes der Alcyonaria, 1887, p. 63.
Lophogorgia Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 150.
Lophogorgia Delage et Hérouard. Traité de Zoologie Concrète, II, 2, 1901, p. 420.

The original definition of this genus is as follows:

"Polypiéroide étalé en forme de panache ou d'éventail, à une ou à plusieurs branches maitresses et à tige aplatie".

Kölliker (1865) placed practically all of the genera of Gorgonidæ, including *Lophogorgia*, in the genus *Gorgonia*.

No further definition of the genus appears until Studer, (1887) gave the definition of which the following is a translation:

"Colony upright, flabellate, with flattened stem and branches and cylindrical twigs. Polyps without calyces, immersed in the cœnenchyma and scattered on all sides of the ultimate branchlets. The larger water-vascular canals are on the flattened sides of the branches, but are peripheral on the round twigs. Spicules small double spindles".

Wright and Studer, (1889) give a definition which is practically identical with the one just quoted, and which is adopted in the present work.

The type of the genus *Lophogorgia* is *Lophogorgia palma* (Pallas). Other described species are *Lophogorgia alba*[1], *L. crista* Möbius, *L. irregularis* Thomson and Henderson, *L. lütkeni* Wright and Studer, *L. rubrotincta* T. and H. and the single new species in the Siboga Collection[2].

1. *Lophogorgia pinnata* new species. (Plate I, figs. 1, 1*a*; Plate III, fig. 1).

Stat. 273. Anchorage off Pulu Jedan, East coast of Aru Islands. 13 meters.

Colony flabellate in form, branching pinnate, not anastomosing, height 31 cm., spread about 12 cm. The stem and larger branches are flattened and marked on their flat surfaces with impressed grooves which are often tortuous and irregular in number and extent. Stem with a cross section of 4.5 mm. × 3.6 mm. 4 cm. from its base it divides into two large and subequal branches. One of these is quite tortuous in its proximal part, giving off irregularly alternate and lateral branchlets which are usually simple, slender and curved outward. The distal part of this branch is comparatively straight and gives off usually simple irregularly

[1] This species is merely mentioned by Duchassaing de Fontbressin (1870) who does not give the authority.
[2] *L. flammea* (Ellis and Solander) is regarded by Milne Edwards and Haime as a synonym of *L. palma* (Pallas).

alternate branches some of which bear branchlets of the third order. The other main branch is straighter than the first, gives off branchlets from one side only of its proximal part and is pinnately branched distally. One of the proximal branchlets bears a regularly spaced row of slender unilateral branchlets resembling those of *Ctenocella*. The ultimate branchlets are all long, slender, round and usually erect. They reach a length of 17 cm. and are about 1.5 mm. in diameter. The calyces are entirely included, being indicated by mere tumidities on the surfaces of the branches and by their openings. They are lacking on the main stem and proximal parts of the larger branches and are mostly lateral on the smaller branches, but sometimes on all sides of the twig terminations.

The individual calyces are so entirely included that they do not admit of description or measurement. Their mouths are indicated by oval openings such as are found in many Plexaurids, and often approach the form of linear slits about 5 mm. in length. Their margins form a slightly elevated rim with scarcely any evidence of lobes. The polyps are deeply retracted within the cœnenchyma, where they take the form of flattened discs with an oval outline and with their tentacles armed with longitudinally disposed spindles.

A cross section of the stem shows a thin cœnenchyma and large water-vascular canals on all sides of the flattened horny axis.

Spicules. These are nearly all double spindles or girdled spindles, more slender than usual and often curved. They are surrounded by symmetrical whorls of verrucæ, the two whorls which bound the girdle being more conspicuous than the others, which diminish gradually in size towards the ends of the spindle. The spicules of this species are remarkably uniform in character, differing mainly in size, due probably to relative age.

Color. Colony white, axis black proximally, lightening distally.

Genus **Leptogorgia** Milne Edwards (emended by Verrill).

Leptogorgia (in part) Milne Edwards et Haime. Histoire naturelle des Coralliaires, I, 1857, p. 163.
Gorgonia (in part) Kölliker. Icones Histiologicæ, II, 1865, p. 139.
Leptogorgia Verrill. Transactions Connecticut Academy of Arts and Science, I, 2, 1867—71, p. 387.
Leptogorgia Verrill. American Journal of Arts and Science, XLVII, 1869, p. 419.
Leptogorgia Studer. Monatsbericht der Königl. Akad. der Wissenschaften zu Berlin, 1878, p. 654.
Leptogorgia Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 151.
Gorgonia (in part) Hickson. Alcyonaria and Hydrocorallinæ of the Cape of Good Hope, 1900, p. 81.
Leptogorgia Delage et Hérouard. Traité des Zoologie concrète, II, 2, 1901, p. 420.
Leptogorgia Nutting. Alcyonaria of the Californian Coast, 1909, p. 722.

The original definition of this genus is as follows:

"Les espèces à axe non calcifère, dont le cœnenchyme est pelliculaire c'est-à-dire très-mince, et d'un tissu serré et dont les calyces n'ont pas les bords saillants. Elle se distingue donc des Gorgones proprement dites, par l'absence de verrues calicifères et s'éloigne des Plexaures par la disposition du cœnenchyme, qui, chez ces derniers, est remarquablement épars et d'une texture subéreuse".

VERRILL (1869—71) defines the genus as follows:

"Spicula of the cœnenchyma mostly small double-spindles of two forms, longer and shorter. Branches usually slender, subdividing in various ways; often reticulate, pinnate or bipinnate. Cells usually prominent, sometimes flat, mostly in lateral rows or bands".

STUDER (1887) gives a definition which is acceptable for our purpose, and of which the following is a translation:

"Colony variously branched, more or less flabellate, often reticulate. Calyces small or included, usually disposed laterally with naked cœnenchyma between. On the bare surfaces the water-vascular canals are indicated by furrows. Spicules minute double spindles of longer and shorter forms.

The type of this genus is *Leptogorgia viminalis* (Esper). A large number of species have been assigned to this genus, especially by VERRILL, and most of the species in the following list are given on his authority, the present writer having been unable to examine the types or to identify the species by the usually very brief descriptions.

Leptogorgia adamsii Verrill, *L. alba* Verrill, *L. agassizii* Verrill, *L. arbuscula* (Philippi), *L. arenata* (Val.), *L. aurantiaca* (Val.), *L. australiensis* Ridley, *L. boryana* (Val.), *L. californica* Verrill, *L. carolinensis* Verrill, *L. caryi* Verrill, *L. cauliculus* (Val.), *L. cuspidata* Verrill, *L. divergens* Studer, *L. diffusa* Verrill, *L. floræ* Verrill, *L. floridiana* Verrill, *L. flavida* Verrill, *L. flexilis* Verrill, *L. labiata* Verrill, *L. media* Verrill, *L. mineacea* (Esper), *L. mineata* Verrill, *L. nobilis* Verrill, *L. peruana* Verrill, *L. pinnata* (Lamk.), *L. porissima* Edwards and Haime, *L. pulchra* Verrill, *L. pumila* Verrill, *L. purpuracea* (Pallas), *L. purpurea* (Pallas), *L. ramulus* (Val.), *L. rigida* Verrill, *L. rosea* (Lamk.), *L. rutila* Verrill, *L. tenuis* Verrill, *L. setacea* Verrill, *L. sanguinolenta* (Pallas), *L. sarmentosa* (Esper), *L. sanguinea* (Val.), *L. stenobrachis* Verrill, *L. teres* Verrill, *L. torresia* Thomson and Herderson, *L. webbiana* (Val.), *L. virgea* (Val.), *L. virgulata* (Lamk.), and the species described beyond.

Many of the above named species have been so inadequately described that identification is practically impossible. In view of this fact the writer thinks it better to describe the single species in the Siboga Collection as new, although he is fully aware that it may be one of the species in the above list.

1. *Leptogorgia formosa* new species (Plate I, figs. 2, 2*a*; Plate III, fig. 2).

Stat. 33. Bay of Pidjot, Lombok. 22 meters and less.

Colony (dried) strictly flabellate, not reticulate although there are a very few anastomoses. Stem and branches round. The main stem extends almost straight to the distal end of the colony. Height 11.8 cm., spread 7.3 cm.; diameter of main stem 2.4 mm. About 1 cm. above its disk-shaped base of attachment the main stem gives off two very strong opposite branches. Above this it gives off irregularly lateral branches at short intervals throughout its length. These in turn give off numerous lateral branchlets most of which are simple, but some of which rebranch until branchings of the fourth order are attained. The whole forms a densely branched typically flabellate structure which appears at first sight to be reticulate, but is not really so.

The distance between branches varies from 2.5 mm. to 11.5 mm. but 3 mm. is a common distance. The calyces are mainly lateral in position, but may be on all sides of the branches. In the dried specimen they are hardly evident, appearing to be entirely included in the cœnenchyma. They were probably low warty verrucæ in the fresh specimen.

The individual calyces can not be successfully studied in the specimen described. In many cases their mouths are so completely closed that there is no trace of an opening, and their diameter can not be measured on account of their walls fading insensibly into the general cœnenchyma of the branch. In some cases the openings appear as oval pores. The characters of the polyps can not be ascertained from the type.

The axis is horny, but shows traces of impregnation by lime salts, particularly in the basal parts. There are no grooves on the stem or branches.

Spicules. These are small spindles, double spindles, girdled spindles and a few double heads. All are regularly tuberculated, the tubercles being usually in definite whorls.

Color. The dried specimen is a dark, bright pink, tending to a carmine. The spicules are mostly carmine.

Genus **Stenogorgia** Verrill.

Stenogorgia Verrill. Bulletin Museum Comparative Zoology, XI, 1, 1883, p. 29.
Stenogorgia Studer. Versuch eines Systemes der Alcyonaria, 1887, p. 64.
Stenogorgia Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. LXII.
Stenogorgia Delage et Hérouard. Traité de Zoologie Concrète, II, 2, 1901, p. 420.
Stenogorgia Nutting. Alcyonaria of the Californian Coast, 1909, p. 722.

The original description of the genus Stenogorgia is as follows:

"Axis horny, branched. Cœnenchyma thin, consisting chiefly of small, warty fusiform spicula, with a few smaller, short, irregular, rough, granule-like spicula next the outer surface, but not forming any regular layer. Calyces scattered or two rowed, more or less prominent, eight-rayed at summit, and filled with spicula like those of the cœnenchyma. Tentacles filled with fusiform spicula and usually incurved, commonly not retracted within the calyces, but capable of it".

STUDER (1887) and subsequent writers adopt this definition without material modification.

The type species of this genus is *Stenogorgia casta* Verrill. Other known species are *Stenogorgia ceylonensis* Thomson and Henderson, *S. kofoidi* Nutting, *S. miniata* (Valenciennes), *S. rosea* Grieg and the new species collected by the Siboga Expedition.

1. *Stenogorgia miniata* (Valenciennes).

Gorgonia miniata Valenciennes. Comptes rendus, XLI, 1855, p. 12.
Gorgonia miniata Milne Edwards et Haime. Histoire Naturelle des Coralliaires, I, 1857, p. 160.
Gorgonia miniata Pourtalès. Contributions to the Fauna of the Gulf Stream at Great depths, 1868, p. 160.
Stenogorgia miniata Studer. Alcyonaires provenant des Campagnes de l'Hirondelle, 1901, p. 51.

Stat. 80. 2° 25′ S., 117° 43′ E. From 50 to 40 meters.
Stat. 117. 1° 0′.5 N., 122° 56′ E. 80 meters.
Stat. 310. 8° 30′ S., 119° 7′.5 E. 73 meters.

Colony (incomplete) flabellate and not reticulate in form, 4.6 cm. high and with a spread of 4.7 cm. The main stem is round in section and 1.5 mm. in diameter. The branches are all lateral, there being 7 on one side and 4 on the other. 5 of the branches are compound, giving off irregularly disposed lateral branchlets, branchings of the third order being sometimes attained. There is no regularity whatever in the distance between branches. The calyces are mainly lateral in position, but may be on all sides of the terminal twigs, and are very unevenly spaced, being from less than 1 mm. to 2 mm. apart.

The individual calyces are dome-shaped verrucæ with the summits divided into 8 not very strongly marked lobes. A typical one measures. 6 mm. in height and 1 mm. in diameter near the base. The upper part of the calyx wall is filled with spicules arranged en chevron and rising in 8 low points around the margin. The polyps are completely retractile and show a well-marked but slender collaret composed usually of a single row of transverse spindles. The tentacles have comparatively large spindles arranged en chevron on their proximal parts and longitudinally placed on the distal parts.

The general cœnenchyma is covered with rather large tuberculate spindles which are usually longitudinal but may lie in any direction. The axis is wholly corneous and the water-vascular canals are not conspicuous.

Spicules. These are nearly all regularly and densely tuberculated terete spindles, usually straight but sometimes curved. They never show a distinct girdle. Most of them are less than .5 mm. long, but an occasional one is found which is relatively large, reaching a length of 1 mm. Minute crosses and irregularly branched forms are occasionally seen.

Color. The colony is a rather dark scarlet, and the spicules are yellowish red or orange.

General distribution. The type was secured in the Antilles. It has also been reported by Studer from the Azores, depth 454 meters.

The Siboga specimens agree well with the description and figures given by Studer. This form reminds one of certain species of the muriceid genus *Muricella*, but the spicules are much smaller than is usual in that genus.

2. *Stenogorgia studeri* new species. (Plate II, figs 1, 1*a*; Plate III, fig. 193).

Stat. 310. 8° 30′ S., 119° 7′.5 E. 73 meters.

Colony flabellate and not reticulate, rigid in habit. The main stem and larger branches are distinctly flattened and grooved on their flat surfaces. Colony 11 cm. in height. The main stem is 2.5 mm. by 2 mm. in section. 4.4 mm. from its base the stem forks, but one of the resultant branches is broken off at its origin. The other main branch bears a number of laterally disposed branchlets which are irregularly spaced and themselves bear lateral branchlets which occasionally bear twigs of the fourth order of branching. The stem and main branches are distinctly furrowed on one of the flattened sides and indistinctly so on the other. Almost all of the calyces are lateral in position and tend to be alternate on the distal parts of the twigs.

The individual calyces are warty of dome-shaped verrucæ, a typical one measuring

8 mm. in height and 1.3 mm. in diameter at the base. They are closely approximated on the distal parts of the colony and more distant, although still rather closely emplanted on the proximal parts. The margin is surrounded by 8 lobes which form an 8-rayed figure when viewed from above. The calyx walls are filled with densely tuberculate spindles which are usually horizontal on basal parts and tend to be vertical on distal parts, especially in the marginal lobes. In the cœnenchyma the spicules are longitudinal as a rule. The polyps are completely retractile, and in retraction lie well below the infolded lobes of the calyx margin. The collaret is very weak, scarcely evident. The tentacles are covered on their dorsal surfaces by small tuberculate spindles which are longitudinal on the distal parts and tend to an en chevron arrangement on the proximal parts.

The cœnenchyma is moderately thin. A cross section of the stem shows inconspicuous water-vascular canals and a corneous axis which is slightly flattened.

Spicules. Stout, densely tuberculate spindles of moderate size, with the tubercles not arranged in distinct whorls, are the characteristic form of this species. Those in the tentacles are smaller and more slender. Rarely a clubshaped form is seen.

Color. The colony, in alcohol, is a light brown with a faint reddish cast in places.

Genus **Platycaulus** Wright and Studer.

Platycaulus Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 148.

The original definition of this genus is as follows:

"Colony branched, the branches in one plane, anastomosing. The axis is horny, flattened, with a calcareous centre and calcareous particles interspersed amid the horny layers: the nutrient canals surrounding the central axis almost as in *Plexaura*. Polyps prominent, on the sides of the stem and branches, retractile within verrucæ. Cœnenchyma moderate, like shagreen. Spicules straight and curved spiny spindles and stellate forms".

The type, and hitherto the only known species of the genus *Platycaulus* is *Platycaulus danielsseni* Wright and Studer.

1. *Platycaulus sibogæ* new species. (Plate II, figs. 2, 2*a*; Plate III, fig. 4).

Stat. 213. Saleyer Anchorage and surroundings. Up to 36 meters.

Colony flabellate, not reticulate, although there are a few anastomoses, loose and flabby in texture, 35 cm. high. Several upright stems spring from a single encrusting base. The largest of these has its main stem and many of the branches and twigs flattened. The stem forks 2 cm. from its base into two unequal branches the largest of which is 6.5 mm. × 5 mm. in section. After giving off several small lateral branches it again forks, 11 cm. from its base, and the resultant branchlets again give off irregularly disposed lateral branchlets at intervals of about 1 cm. Branches of the 6th order are sometimes attained. In a few cases the branches anastomose, but not often. The ultimate twigs are flattened, being about 2 mm. by 1 mm. in section, short, and generaly pinnate in arrangement. The calyces are usually lateral in position,

but are not infrequently disposed on three sides of the smaller branches. Quite a number of the medium sized branches are round in section.

A cross section of a branch shows a rather thin cœnenchyma and a comparatively thick axis cylinder with a central white core. The water-vascular canals are not prominent.

The individual calyces are low verrucæ the margins of which are 8-lobed and do not seem capable of closing over the retracted polyps. A typical calyx measures 1 mm. to the top of the infolded mass of tentacles and is 1 mm. broad at its base. The calyx walls are filled with transversely placed slender crimson spindles which tend to an en chevron arrangement near the margin. The polyp has a well-marked collaret of similar spindles beset with sharp thorny points, and the tentacle bases bear similar crimson spindles arranged longitudinally on their dorsal surfaces. On the proximal parts of the tentacles these spindles tend to an en chevron arrangement. These spicules show in conspicuous relief against the pallid substance of the tentacles.

Spicules. These are mainly slender spindles with their surfaces often comparatively smooth and often, especially in the case of the spindles, beset with sharp thorny points. Many of these slender spindles are curved and some of them are relatively very large, attaining a length of 1.5 mm. These large spicules are generally on the surface of the cœnenchyma, where they are longitudinally disposed. I do not find any stellate forms such as are described as occurring in *Platycaulus danielsseni*.

Color. The colony is a very dark rich wine-color or dark crimson. The polyps (in alcohol) are white with crimson spicules, but they may have been yellow in life.

This species bears a superficial resemblance to *Gorgonia radula* Möbius[1], but the spicules are entirely different.

[1] Neue Gorgoniden des Naturhistorischen Museums zu Hamburg, Jena, 1861, p. 9, pl. III.

DISTRIBUTION OF THE GORGONIDÆ COLLECTED BY THE SIBOGA EXPEDITION.

List of Stations

at which Gorgonidæ were collected by the Siboga Expedition and the Species collected at each Station.

STATION 33. Bay of Pidjot, Lombok. 22 meters, and less. Mud, coral and coral sand. *Leptogorgia formosa.*

STATION 80. 2° 25′ S., 117° 43′ E. Borneo bank. From 50 to 40 meters. Fine coral sand. *Stenogorgia miniata.*

STATION 117. 1° 0′.5 N., 122° 56′ E. Kwandang Bay entrance, Celebes. 80 meters (chart). Sand and coral. *Stenogorgia miniata.*

STATION 213. Saleyer Anchorage. Up to 36 meters. Mud and mud with sand. *Platycaulus sibogæ.*

STATION 273. Anchorage off Pulu Jedan, East coast of the Aru Islands, (Pearl Banks). 13 meters. Sand and shells. *Lophogorgia pinnata.*

STATION 310. 8° 30′ S., 119° 7′.5 E. Flores Sea. 73 meters. Sand with a few pieces of dead coral. *Stenogorgia miniata, Stenogorgia studeri.*

The data given above show that all of the Gorgonidæ collected by the Siboga were taken from comparatively shallow water, the deepest haul being from Station 117 where the depth, indicated by the chart, was 80 meters.

But one species in the above list is known to occur outside of the region visited by the Siboga, and that is *Stenogorgia miniata* which was previously recorded from the West Indies, and also from the Azores from a depth of 454 meters. This is the same species which was secured from the greatest depth yielding a member of the family Gorgonidæ secured by the Siboga.

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EXPLANATION OF PLATES

The photographs were made from nature by the author.
The spicules were drawn under the camera lucida by Mr. DAYTON STONER.

PLATE I.

Fig. 1. *Lophogorgia pinnata* n. sp. Natural size. 1 *a*, part of branch × 5.
Fig. 2. *Leptogorgia formosa* n. sp. Natural size. 2 *a*, part of branch × 5.

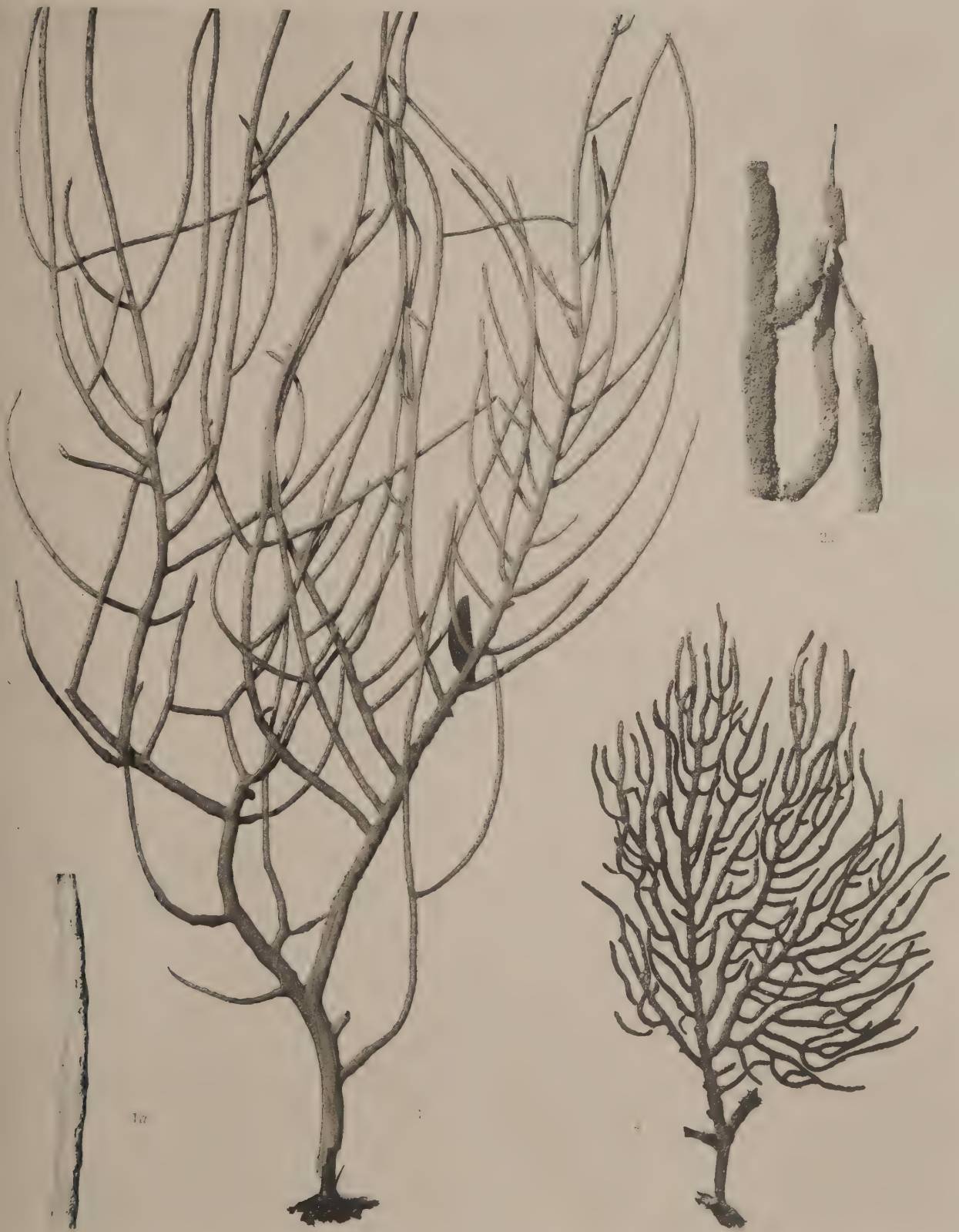


PLATE II.

Fig. 1. *Stenogorgia studeri* n. sp. Natural size. 1 *a*, part of branch × 5.
Fig. 2. *Platycaulus sibogæ* n. sp. Natural size. 2 *a*, part of branch × 5.

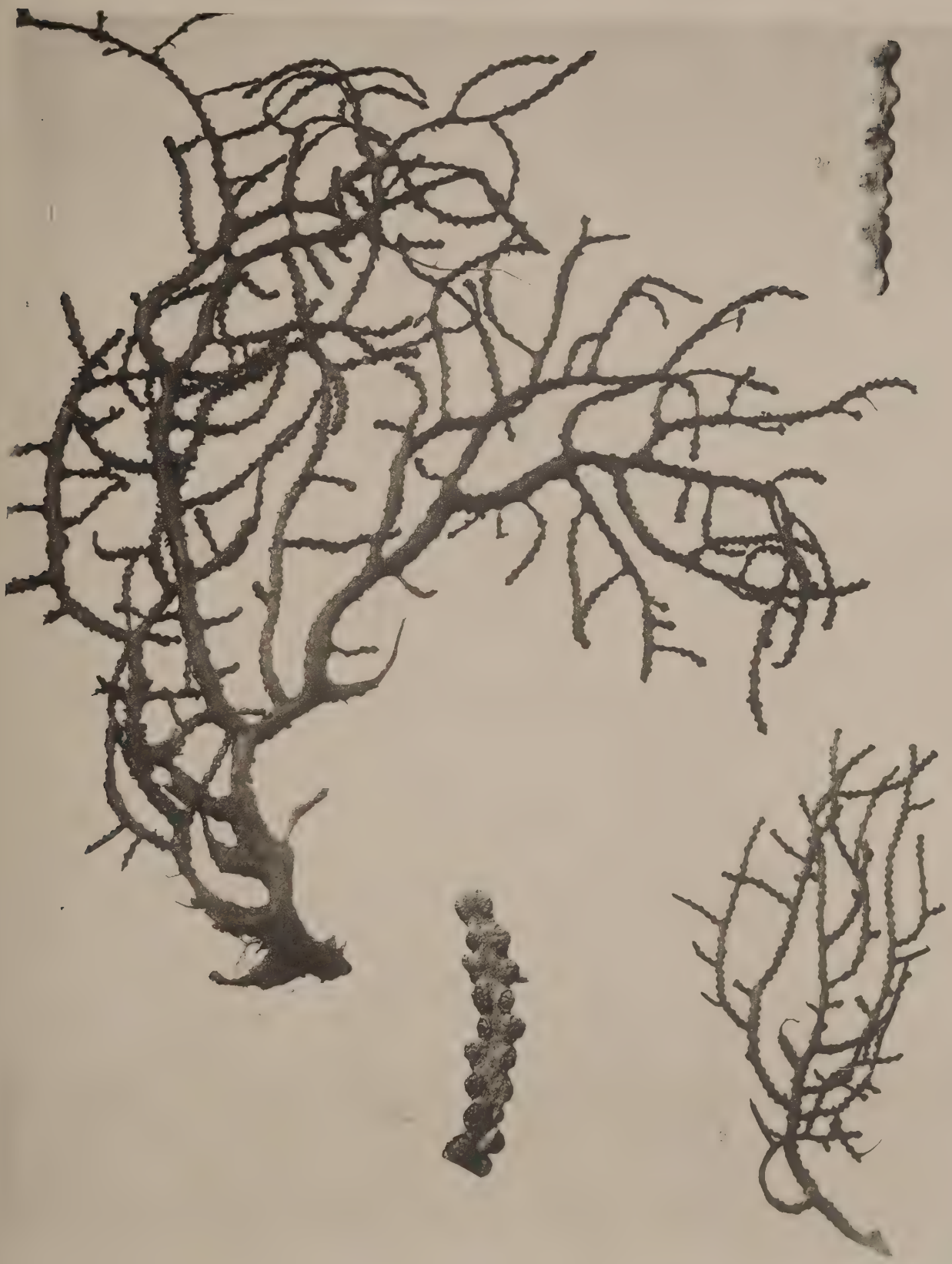
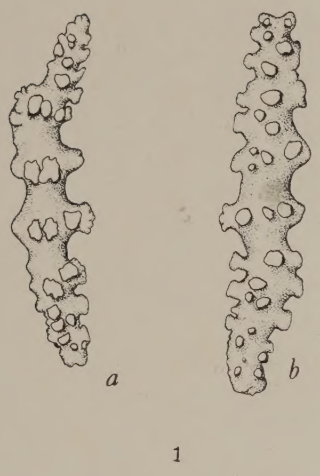


PLATE III.

Fig. 1. *Lophogorgia pinnata* n. sp. Group of 2 spicules, *a* and *b* × 350.
Fig. 2. *Leptogorgia formosa* n. sp. Group of 4 spicules, *a*, *b*, *c* and *d* × 250.
Fig. 3. *Stenogorgia studeri* n. sp. Group of 5 spicules, *a*, *b*, *c*, *d* and *e* × 120.
Fig. 4. *Platycaulus sibogæ* n. sp. Group of 4 spicules, *a*, *b*, *c* and *d* × 120.



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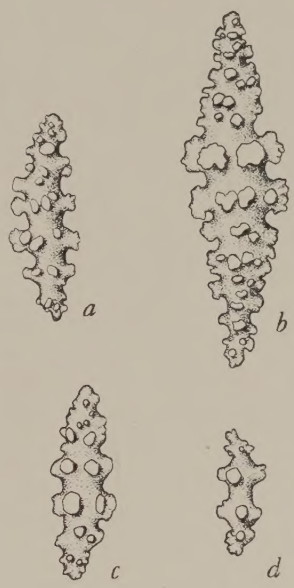

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